

In a¹ ^{at} what is claimed is:

add
a¹
1. A fuel injector for fuel injection systems of internal combustion engines, in particular for direct injection of fuel into a combustion chamber of an internal combustion engine, having an energizable actuating element, having a valve needle which is axially movable along a longitudinal axis of the valve and has a valve closing section on its downstream end which works together with a fixed valve seat for opening and closing the valve, the valve seat being designed on a valve seat element, and having swirl-producing means arranged upstream from the valve seat,

characterized in that a flattened face (29) running perpendicular to the longitudinal axis (8) of the valve is provided on the downstream end of the valve closing section (28) downstream from the valve seat (27).

2. The fuel injector according to Claim 1, characterized in that the valve closing section (28) is designed to be at least partially spherical or rounded, with the flattened face (29) adjacent to this curved area.

3. The fuel injector according to Claim 1, characterized in that the valve closing section (28) is designed at least partially with a truncated conical taper in the downstream direction, and the flattened face (29) follows this conical area.

4. The fuel injector according to one of the preceding claims, characterized in that the swirl-producing means are designed in the form of a disk-shaped swirl element (47) directly upstream from the valve seat (27).

5. The fuel injector according to one of the preceding claims, characterized in that an outlet orifice (32) follows downstream from the valve seat (27).

6. The fuel injector according to Claim 5,
characterized in that the outlet orifice (32) is formed in the valve seat element (26).

7. The fuel injector according to Claim 5,
characterized in that a spray element (67) having the outlet orifice (32) is arranged
downstream from the valve seat element (26) and is fixedly connected thereto.

8. The fuel injector according to Claim 5,
characterized in that the flattened face (29) has a diameter d which is greater than diameter D
of the downstream outlet orifice (32).

9. The fuel injector according to Claim 4,
characterized in that the swirl element (47) has an inner opening area (90) having a plurality
of swirl channels (93) extending completely over the entire axial thickness of the swirl
element (47), the swirl channels (93) not being connected to the outer periphery of the swirl
element (47) by a peripheral edge area (96).

10. The fuel injector according to Claim 9,
characterized in that the inner opening area (90) is formed by an inner swirl chamber (92) and
by a plurality of swirl channels (93) opening into the swirl chamber (92).

11. The fuel injector according to Claim 10,
characterized in that the swirl channels (93) have ends (95) at a distance from the swirl
chamber (92), these ends as inlet pockets having a larger cross section than the remainder of
the swirl channels (93).

add
g1